



PostDoc Job Opportunity



DUBLIN CITY UNIVERSITY	First Name	Last Name	email	Institute	Address
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School:	School of Electronic Engineering				
Research Centre / group affiliation:	The Rince Institute				
Research group / centre website:	http://www.eeng.dcu.ie/~nano/				

Brief summary of research group / centre activity

The Nanomaterials Processing Laboratory (NPL) main focus is on nanometrology and plasma diagnostics for electronic and biomaterials applications. Total staff consists of 2 Faculty, 6 Post-Docs, 18 PhD students, 5 MEng students and 3 technicians. Key interests: X-ray diffraction imaging for strain and defect mapping. Photoacoustics hardware and software design. Nanomaterials characterisation. Plasma diagnostics and biomedical applications.

Description of postdoctoral project on offer:

Advanced packaging processes lead to very thin packages where there is a trade-off between the thickness of constituent package layers and their rigidity, thus leading to reliability problems. Currently there are no compelling metrologies that can non-destructively measure and monitor real-time, or near real-time the stress and/or warpage of the semiconductor die inside these packaged chips during and after their thermal processing. We have developed a world-first non-destructive and in situ metrology known as 'B-Spline X-Ray Diffraction Imaging (B-XRDI)' [1], which reconstructs strain field and lattice misorientation data from x-ray diffraction images of the in situ die inside advanced IC packages. Highlights include:

- Synchrotron-source based: Currently 8 seconds to measure Si die warpage in fully encapsulated 8 mm x 8mm chip.
- Already transferred the technology to a laboratory-based source and applying the B-Spline technique, warpage maps are also produced of the entire silicon die.
- Capable of measuring the impact of thermal process steps in situ.

Building on these breakthroughs, the candidate will work within NPL to:

Develop real-time B-XRDI analysis of process steps (e.g. < 1 sec per package at synchrotron sources) to analyse the development of thermally induced stresses/warpage/damage. Transfer this new knowledge to lab-based sources for in fab application.

[1] J. Stopford, A. Henry, D. Manassis, N. Bennett, K. Horan, D. Allen, J. Wittge, L. Boettcher, A. Cowley, P.J. McNally, in Proceedings of the 18th European Microelectronics Packaging Conference (2011), pp. 1-8 and arXiv:1204.1466v1 (2012).

Please indicate the core skills or disciplines that are required for this position:

Experience in x-ray diffraction-based metrology. Familiarity with nanomaterials and/or nanoelectronics. Experience with instrumentation design and build. Self motivated, good communication skills, and willingness to work within a vibrant research team.